

A1DD 产品技术规格书

<p>产品型号</p>	<p>ABTEC-A1DD</p>	
<p>产品功能</p>	<p>音频测试分析仪</p>	
<p>产品版本</p>	<p>V1.0</p>	
<p>产品外观</p>	<p>前面板图</p>	
	<p>后面板图</p>	

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一. 适用范围

本产品适用于音频电路板及音频终端设备的测试应用。

二. 一般规范

序号	项目参数	规格要求
2.1	外形尺寸	428mm*318mm*120mm
2.2	重量	7kg ± 0.5kg
2.3	工作温度	0°C ~ 45°C
2.4	工作电压 (AC)	220V,50Hz/110V220V,50H
2.5	贮存温度	-40° C~75° C
2.6	湿度	10~80%

三. 功能模块

模拟输出通道数:	2 通道
模拟输入通道数:	2 通道
数字输出通道数:	1 通道
数字输入通道数:	1 通道
模拟输出端口类型:	XLR/BNC
模拟输入端口类型:	XLR/BNC
数字输出端口类型:	XLR/BNC/OPT
数字输入端口类型:	XLR/BNC/OPT
音视频输入端口类型:	AUX IN/OUT
通讯端口类型:	USB/串口

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四. 性能参数

Characteristic	Specifications	Supplemental Information
<u>ANALOG GENERATOR</u>		
Number of Channels	2, independent amplitude control	
Waveforms	Sine, sine split frequency, sine split phase, sine+DC offset, continuously swept-sine, noise, IMD test signals, multi-tone, wave file playback	
Sine Characteristics		
Frequency Range (Fs)	2 Hz to 80.1 kHz	Setting resolution is typically 45 μ Hz
Frequency Accuracy	$\pm (0.0003\% + 100 \mu\text{Hz})$	
Amplitude Range	0 to 16.00 Vrms [45.2 Vpp], balanced; 0 to 8.00 Vrms [22.6 Vpp], unbalanced	
Amplitude Accuracy, 1 kHz	$\pm 0.05 \text{ dB}$ [$\pm 0.58\%$]	
Flatness (1 kHz ref)		
Fs = 10 Hz to 20 kHz	$\pm 0.010 \text{ dB}$	typically $< 0.005 \text{ dB}$.
Fs = 20 kHz to 50 kHz	$\pm 0.030 \text{ dB}$	
Fs = 50 kHz to 80 kHz	$\pm 0.10 \text{ dB}$	
Residual THD+N		
Fs = 20 Hz - 20 kHz	$\leq (-102 \text{ dB} + 1.4 \mu\text{V})$, 20 kHz BW	
Non-Harmonic Content		Typically $< -110 \text{ dB}$ when Fs $\leq 75 \text{ kHz}$, increasing to $\approx -55 \text{ dB}$ at Fs = 80 kHz
Phase Offset Range (SplitPhase)	- 179.999 to +180.000 deg	
DC Offset Range	$\pm 12.00 \text{ Vdc}$ balanced; $\pm 6.00 \text{ Vdc}$ unbalanced	DC offset limits maximum ac signal
Residual DC Offset	$\leq 0.25\%$ of Vrms setting [$\leq 0.09\%$ of Vpp setting] + 100 μV	

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Noise Characteristics		
Shape	White (<5 Hz to 86.4 kHz), Pink (<10 Hz to 86.4 kHz), IEC 60268-1 or BS EN 50332-1	
Amplitude Range	0 to 45.2 Vpp, balanced; 0 to 22.6 Vpp, unbalanced	Amplitude calibration is approximate
IMD Test Signals (requires option AML)		
SMPTE & MOD		
Lower Frequency (LF)	40 Hz to 1.00 kHz	
Upper Frequency (HF)	2.00 kHz to 60.00 kHz	HF tone must be ≥ 6 • LF tone.
Mix Ratio (LF:HF)	10:1, 4:1 or 1:1	4:1 maximum with SMPTE signal.
Amplitude Range	0 to 45.2 Vpp, balanced; 0 to 22.6 Vpp, unbalanced.	
Amplitude Accuracy	± 0.06 dB [$\pm 0.70\%$]	
Residual IMD	$\leq 0.0025\%$ [-92 dB], 4:1 mix ratio	
DFD		
Difference Frequency (Fdiff)	80 Hz to 2.00 kHz	$F_{mean} = (F1 + F2)/2.$
Mean Frequency (Fmean)	250 Hz to 60.00 kHz	$F_{diff} = F2 - F1 $ Fmean Must be ≥ 6 • F diff
Amplitude Range	0 to 45.2 Vpp, balanced; 0 to 22.6 Vpp, unbalanced.	
Amplitude Accuracy	± 0.06 dB [$\pm 0.70\%$]	
Residual IMD	$\leq 0.0010\%$ [-100 dB]	
Multitone, Wave File Playback (requires option HST)		
Sample Rate Range (SR)	8 kS/s to 108 kS/s, and 175 kS/s to 192 kS/s	Operation from 109 kS/s to 175 kS/s is possible, but with degraded flatness
Maximum File Size	32 MSample.	
Amplitude Range	0 to 45.2 Vpp, balanced; 0 to 22.6 Vpp, unbalanced.	.Wav file must peak at digital full scale to obtain selected amplitude

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Flatness (1 kHz ref)		
SR = 175 kS/s to 192 kS/sec		Typically <0.012 dB to 20 kHz
SR = 8 kS/s to 108 kS/s		Typically <0.04 dB to 20 kHz; max frequency limited to $\approx 0.45 \cdot SR$
Spurious Content		Typically < -100 dB
Output Equalization	Arbitrary 30-pole output filter	
Source Resistance (Rs)		
Balanced	Selectable $100 \Omega \pm 1\%$ or $600 \Omega \pm 1\%$.	Grounded, symmetrical
Unbalanced	Selectable $50 \Omega \pm 1.5\%$ or $600 \Omega \pm 1\%$.	
Common Mode Test	Same as Balanced selections	
Max Output Current		Typically >50 mA peak, 50 mA dc
Reverse Overload Protection		Up to 30 W
Output Related Crosstalk	$\leq (-120 \text{ dB} + 1 \mu\text{V})$ to 20 kHz	
<u>ANALOG ANALYZER</u>		
Number of Channels	2, independently auto-ranging.	Max ADC sample rate = 192 kS/s
Maximum Rated Input	230 Vpk, 230 Vdc any input to ground;	
Input Impedance		
Balanced	$100 \text{ k}\Omega \approx 230 \text{ pF}$, each side to gnd	
Unbalanced	$100 \text{ k}\Omega \approx 230 \text{ pF}$ to bnc shield	
Input Termination	Selectable $600 \Omega \pm 1\%$, 1.5 W max.	Termination automatically opens in the 80 V range.

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Input Coupling	Selectable DC or AC	Typically $< 0.5 \mu\text{A}$ bias current with DC coupling, typically $< 0.03 \text{ dB}$ roll-off at 20 Hz with AC coupling
Input Ranges	250 mVrms to 250 Vrms	Maximum ac signal is $\approx 230 \text{ Vac}$ unbal, 350 Vac bal, in the 250V range
Common Mode Rejection		Max common mode signal range:
250 mV, 800 mV, 2.5 V ranges	$\geq 80 \text{ dB}$, 5 Hz to 5 kHz; $\geq 70 \text{ dB}$, 5 kHz to 20 kHz.	$\pm 6 \text{ Vpk}$
8 V range	$\geq 50 \text{ dB}$, 5 Hz to 20 kHz	$\pm 12 \text{ Vpk}$
25 V range	$\geq 50 \text{ dB}$, 5 Hz to 20 kHz	$\pm 60 \text{ Vpk}$
80 V range	$\geq 45 \text{ dB}$, 5 Hz to 20 kHz	$\pm 120 \text{ Vpk}$
250V range	$\geq 45 \text{ dB}$, 5 Hz to 20 kHz	$\pm 230 \text{ Vpk}$
Input Related Crosstalk	$\leq (-120 \text{ dB} + 0.3 \mu\text{V})$ to 20 kHz	$R_s \leq 600 \Omega$
Level (Amplitude) Measurement		
Range		
Balanced or bridging input	$< 1 \mu\text{V}$ to 350 Vrms	
Unbalanced input	$< 1 \mu\text{V}$ to 230 Vrms	
Accuracy (1 kHz)	$\pm 0.05 \text{ dB}$ [$\pm 0.60\%$]	
Flatness (1 kHz ref, DC coupling)		
10 Hz to 20 kHz	$\pm 0.010 \text{ dB}$	Typically $< 0.005 \text{ dB}$.
20 kHz to 50 kHz	$\pm 0.030 \text{ dB}$	
50 kHz to 80 kHz	$\pm 0.10 \text{ dB}$	
Residual Noise (inputs shorted)	$\leq 1.4 \mu\text{Vrms}$, 20 kHz BW	Typically $< 8.0 \text{ nV}/\sqrt{\text{Hz}}$ at 1 kHz
THD+N Measurement		
Fundamental Range	5 Hz to $> 90 \text{ kHz}$	
Measurement Range	0 to 100%	
Accuracy	$\pm 0.5 \text{ dB}$	
Residual THD+N		
20 Hz - 20 kHz fundamentals	$\leq (-102 \text{ dB} + 1.4 \mu\text{V})$, 20 kHz BW	
Bandwidth Limiting Filters		
High-Pass		

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DC	DC coupling	
AC (< 10 Hz)	AC coupling	Response is 2-pole via a combination of analog and digital filters, and is typically -3 dB at 4.1 Hz
Butter worth	FHP (-3 dB) = 10 Hz to 90 kHz, 4-pole	
Elliptic	FHP (-0.01 dB) = 10 Hz to 90 kHz; 5-pole; 0.01 dB pass-band ripple; ≤ -60 dB stop-band	
Low-Pass		
ADC Pass band	No filter is implemented, bandwidth and response are limited by the A/D and sample rate (SR)	-3 dB at $\approx 0.490 \cdot SR$, $SR \leq 216$ kS/s
20k (AES17), 40k (AES17)	Special filters conforming with AES17	
Butterworth	FLP (-3 dB) = 10 Hz to 90 kHz, 8-pole	ENBW $\approx 1.006 \cdot FLP$
Elliptic	FLP (-0.01 dB) = 10 Hz to 90 kHz, 8-pole; 0.01 dB pass-band ripple; ≤ -60 dB stop-band	ENBW $\approx (1.012 - 1.062) \cdot FLP$ (varies due to warping)
Weighting	A-wt, B-wt, C-wt, CCIR-1k, CCIR-2k, CCITT, C-message, 50 μ s or 75 μ s de-emph (with and without A-wt), or None	Weighting filter is cascaded with both high-pass and low-pass filters
Input Equalization	Arbitrary 30-pole input filter	The EQ operates on any selected analyzer input channels.

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IMD Measurement		
Test Signal Compatibility		
SMPTE & MOD	Any combination of 40 Hz - 1 kHz (LF) and 1kHz - 60kHz (HF), mixed in any ratio from 1:1 to 10:1 (LF:HF)	HF tone must be $\geq 6 \cdot$ LF tone.
DFD	Any two-tone combination with mean frequency of 250 kHz - 60 kHz and a difference frequency of 80 Hz - 2.0 kHz	$F_{mean} = (F1+F2)/2$, $F_{diff} = F2 - F1 $. F_{mean} must be $\geq 6 \cdot F_{diff}$
IMD Measured		
SMPTE	Amplitude modulation of HF tone.	Measurement BW is typ. 40 - 750 Hz.
MOD	d2, d3, d2+d3, or d2+d3+d4+d5	Use "d2+d3" for measurements per IEC 60268
DFD	d2, d3, d2+d3, or d2+d3+d4+d5	Use "d2+d3" for measurements per IEC 60268
Measurement Range	0 to 20%	
Accuracy	± 0.5 dB	
Residual IMD		
SMPTE & MOD	≤ -92 dB [0.0025%], 4:1 mix ratio	
DFD	≤ -100 dB [0.0010%]	
Frequency Measurement		
Range	5 Hz to 90 kHz	
Accuracy	$\pm 0.0003\%$ [3 ppm]	V_{in} must be ≥ 5 mV.
Resolution	6 digits	
Phase Measurement		
Ranges	- 90 to +270, ± 180 , or 0 to 360 deg	
Accuracy	± 0.2 deg, 5 Hz to 5 kHz; ± 0.8 deg, 5 kHz to 20 kHz; ± 2.0 deg, 20 kHz to 50 kHz	V_{in} must be ≥ 5 mV with dc coupling, both channels. Accuracy degrades below 50 Hz with ac coupling.
Resolution	0.001 deg	
DC Voltage Measurement		
Input Ranges	0.25 V to 250 V	± 230 Vdc maximum in 250V range

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Accuracy		
250 mV and 800 mV ranges	$\pm (0.7\% \text{ reading} + 1 \text{ mV})$	
2.5 V–250 V ranges	$\pm (0.7\% \text{ reading} + 0.1\% \text{ range})$	
Normal Mode Rejection		Typically > 90 dB, 20 Hz to 20 kHz.
DIGITAL I/O		
DIGITAL OUTPUT RELATED:		
Formats		
Electrical, unbalanced	SPDIF-EIAJ per IEC60958, 0.50 Vpp or 1.00 Vpp $\pm 10\%$ into 75 Ω	Output R is nominally 75 Ω .
Electrical, balanced	AES-EBU per AES3-1992, 5.00 Vpp $\pm 10\%$ into 110 Ω	Output R is nominally 110 Ω .
Optical	Toslink	
Sample Rate (SR) Range		
Electrical	27 kS/s to 200 kS/s	Usable over the extended range of 16 kS/s to 216 kS/s with degraded waveform
Optical	27 kS/s to 108 kS/s	
Sample Rate (SR) Accuracy	$\pm 0.0003\%$ [3 ppm]	
Channel Status Bits	Full implementation per IEC-60958	Automatically set or manual override, hex or plain English
User Bits and Validity Flag	Fully settable	
Residual Jitter 1,6		
Electrical		Typically < 1.5 ns
Optical		Typically < 2.5 ns, SR ≤ 96 kS/s
EMBEDDED OUTPUT SIGNAL RELATED		

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五. 电声选件 AX- SPK-PT/RD

A1DD 扬声器研发/生产测试选件，以单次快速扫描和易用性提供多参数检查扬声器的规格和性能，确保扬声器和音箱的完整性，并同时检查 Rub & Buzz 缺陷、相对电平、相位、失真比和失真噪声电平等，比较黄金样本。

通过快速连续扫描信号，找出高振幅因数和高峰值比从而检查 Rub & Buzz 异音缺陷。这些缺陷包括音圈移位、松散在音圈隙、不完全粘连的悬浮物料等；在这些情况下，所产生的问题是瞬变和很难检测到，不能使用标准计算例如 FFT 测量或人工检测。

主要功能：

- ☆基本电声参数测量（阻抗和 T/S 小参数）
- ☆SPL/THD 测试
- ☆喇叭生产测试
- ☆异音 Rub & Buzz 检测
- ☆瀑布和极化图
- ☆空气泄露检测
- ☆其他声学测量

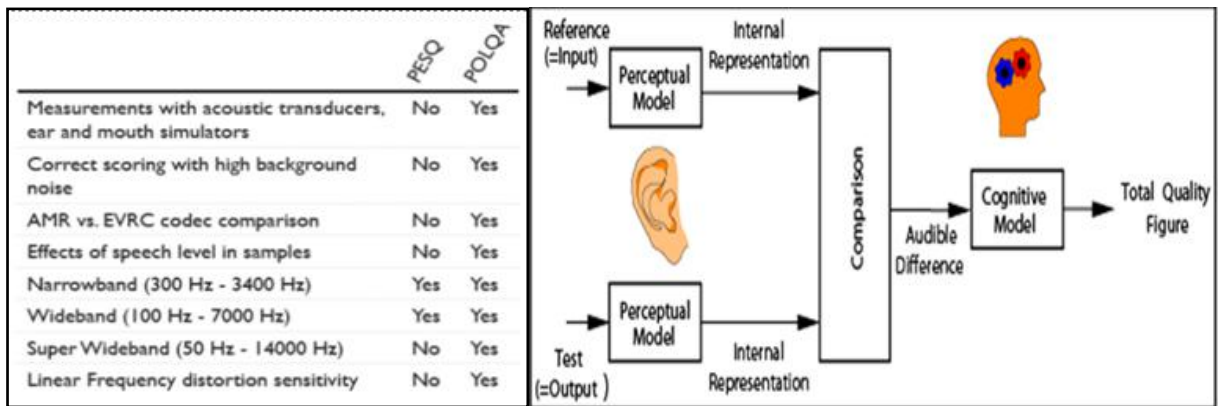
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六. 主观音质评测选件

AX-PESQ 基于 ITU-T P. 862 标准

AX-POLQA2 基于 ITU-T P. 863 标准

感知音频测量广泛应用与智能手机，VoIP 网络和设备测试，衡量人们如何感知声音品质。感知声音品质测试是特别有用于宽频或位元速率有限的设备，使用标准的正弦波测试如频响和失真等这些参数不能有效地测试和比较不同设备性能；最后，只有用感知和电气音频测试组合，才可以完全说明这些设备的性能。



PESQ 是一个感知语音品质测量工具。它由德国 OPTICOM 有限公司开发，根据 ITU-T 建议专为低频宽的设备，例如手机和智慧手机上测试语音品质，适当的测试信号可以达到类似使用人类测试的结果，有很高的相关性；

POLQA2 加强至宽带语音品质和声学接口等等测试。

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七. 环境试验特性

环境试验特性

试验条件	环境温度	15℃~35℃
	相对湿度	25%~75%
	气压	86~106kpa
6.1	电源适应性	执行 GB/T 6587-2012 条款 4.10
6.2	介电常数	执行 GB/T 6587-2012 条款 5.8.2
6.3	保护接地	执行 GB/T 6587-2012 条款 5.8.3
6.4	温度实验	执行 GB/T 6587-2012 条款 5.9.1
6.5	湿度实验	执行 GB/T 6587-2012 条款 5.9.2
6.6	冲击实验	执行 GB/T 6587-2012 条款 5.9.4
6.7	裸机振动试验	执行 GB/T 6587-2012 条款 5.9.3
6.8	包装振动实验	执行 GB/T 6587-2012 条款 5.10.1

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八. EMC 特性

执行 GB/T 6587-2012 《电子测量仪器通用规范》---4.9 条款

7.1	传导骚扰	150kHz~30MHz 电源端子的传导骚扰电压限值 (B 级)
7.2	辐射骚扰	辐射骚扰限值 B 级
7.3	静电放电抗扰度	性能判据: 等级 B
7.4	射频电磁场辐射抗扰度	性能判据: 等级 A
7.5	电快速瞬变脉冲群抗扰度	实验判据: 等级 B (GB/T 17626.4-2008 等级四)
7.6	浪涌 (冲击) 抗扰度	实验判据: 等级 B
7.7	射频场感应的传导骚扰抗扰度	性能判据: 等级 A
7.8	电压跌落、暂降和短时中断抗扰度	性能判据: 等级 B

九. ROHS 检测

本产品符合 GB/T26572-2011 对有害物质的限量要求

本产品有害物质名称及含量

部件名称	有害物质					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
外壳组件	×	○	○	○	○	○
线路板组件	×	○	○	○	○	○
电源组件	○	○	○	○	○	○
线材组件	○	○	○	○	○	○
配件	×	○	○	○	○	○

备注:

○: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572-2011 规定的限量要求以下。

×: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572-2011 规定的限量要求。

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十. 产品遵守标准(国际标准/行业标准/企业标准)

本产品遵守如下国家标准:

8.1 《GB_T 6587-2012_5625 电子测量仪器通用规范》

8.2 《JJF 1395-2013 音频分析仪校准规范》

8.3 《GB/T26572-2011 电子电气产品中限用物质的限量要求》

8.4 《SJ/T11364-2014 电子电气产品中限用物质限制使用标识要求》